What is claimed is:

1.   A data I/O system comprising:

a plurality of storage devices; and

a controller which controls said storage devices,

5   wherein said controller includes:

a read/write unit, responsive to the subsequent receipt of a read request and a write request, for reading data stored in said storage devices and writing data in said storage devices;

10   a logical volume management unit for mapping between a logical image of the data storage of a host processor (logical volume) and an actual space in said storage devices;

a volume management unit for managing an active

15   primary production volume (P-VOL) and second multiple mirror volumes (S-VOL) created as mirror images of said primary volume; and

an S-VOL restoring unit for restoring the data of a first S-VOL with the data of a second S-VOL depending on

20   the type of an error that happens in the first S-VOL.

2.   A data I/O system according to claim 1,

wherein said controller further includes an access management unit for rendering at least one of said S-VOLs

25   read-only,

wherein said S-VOL restoring unit recovers an S-VOL where an error has happened by copying data of the Read-only (RO) S-VOL to said S-VOL.

3.   A data I/O system according to claim 1,

wherein said controller includes an access management unit for rendering at least one of said S-VOLs read-only,

wherein said S-VOL restoring unit recovers an S-VOL where a drive error has happened by replacing it with said RO S-VOL.

4.   A data I/O system according to claim 1,

wherein said controller further includes:

an access management unit for rendering at least one of said S-VOLs read-only; and

a monitoring unit for monitoring frequencies of accesses to RO S-VOLs,

wherein said S-VOL restoring unit restores the data of an S-VOL where an error has happened by copying the data of an S-VOL with the lowest access frequency.

5.   A data I/O system according to claim 1,

wherein said controller further includes:

an access management unit for rendering at least one of said S-VOLs read-only; and

a monitoring unit for monitoring frequencies of accesses to the RO S-VOLs,

wherein said S-VOL restoring unit recovers an S-VOL where a hardware error has happened by replacing it with a RO S-VOL with the lowest access frequency.

6.   A data I/O system according to claim 1,

wherein said controller further includes:

an access management unit for rendering at least
one of said S-VOLs read-only and rendering at least one
of said S-VOLs read-and-writable; and

an increments management unit for storing updates
that have occurred in a Read-and-Writable (RW) S-VOL
since a P-VOL and the RW S-VOL were separated in an
increments-volume,

wherein said S-VOL restoring unit recovers a RW S-
VOL where an error has happened by replacing it with the
RO S-VOL that has been updated by data of the increments-
volume of the RW S-VOL.

7.   A data I/O system according to claim 1,

wherein said controller further includes:

an access management unit for rendering at least
one of said S-VOLs read-only and rendering at least one
of said S-VOLs read-and-writable;

a monitoring unit for monitoring frequencies of
accesses to the RO S-VOLs; and

an increments management unit for storing updates
that have occurred in a RW S-VOL since a P-VOL and the RW
S-VOL were separated in an increments-volume,

wherein said S-VOL restoring unit recovers a RW S-
VOL where an error has happened by replacing it with the
RO S-VOL with the lowest access frequency that has

updated by data of the increments-volume of the RW S-VOL.

8. A data I/O system according to claim 7,

wherein said controller further includes a spare S-
VOL management unit for managing a spare S-VOL to which
read/write accesses are forbidden,

wherein said S-VOL restoring unit recovers an S-VOL
where an error has happened by using said spare S-VOL
instead of said RO S-VOL.

9. A data I/O system according to claim 7 further
comprising a plurality of the storage devices,

wherein said S-VOL restoring unit replaces a
storage device where a hardware error has happened and
forms an S-VOL with another hardware device.

10. A data I/O system according to claim 8 further
comprising a plurality of the storage devices,

wherein said S-VOL restoring unit replaces a
storage device where a hardware error has happened and
forms an S-VOL with another hardware device.

11. A data I/O system according to claim 1,

wherein said storage devices are disk drives,

wherein said controller further includes a
communication adapter communicating with a data
processing system issuing read and write requests.

12. A method of controlling a data I/O system which includes:

a plurality of storage devices;

a read/write unit, responsive to the subsequent receipt of a read request and a write request, for reading data stored in said storage devices and writing data in said storage devices; and

a logical volume management unit for mapping between a logical image of the data storage of a host processor (logical volume) and an actual space in said storage devices;

said method comprising the steps of:

managing an active primary production volume (P-VOL) and second multiple mirror volumes (S-VOL) created as mirror images of said primary volume; and

restoring the data of a first S-VOL with the data of a second S-VOL depending on the type of an error that happens in the first S-VOL.